

Claims

What is claimed is:

1. A method comprising the steps of:
providing a material for use in food or liquid packaging, said material comprising a plastic film, said plastic film having been subjected to plasma treatment inside the vacuum chamber of a metallization apparatus, said plastic film having been coated on at least one side with a desired metal to form a metallized plastic film, said metallized plastic film comprising an oxygen transmission rate (OTR) of no greater than 0.03 cc/100in²/day, and a water vapor transmission rate of no greater than 0.035 gr/100in²/day at 100°F and 100% RH.
2. A method as claimed in claim 1, wherein said metal is aluminum.
3. A method as claimed in claim 1, wherein said metal is silver.
4. A method as claimed in claim 1, wherein said metal is gold.
5. A method as claimed in claim 1, wherein said metal is tin.
6. A method as claimed in any of claims 1-5, wherein said plastic film comprises polyester.
7. A method as claimed in any of claims 1-5, wherein said plastic film comprises polypropylene.
8. A method as claimed in any of claims 1-5, wherein said plastic film comprises polyethylene.
9. A method as claimed in any of claims 1-5, wherein said plastic film comprises polyvinyl chloride.
10. A method as claimed in any of claims 1-5, wherein said plastic film comprises nylon.

11. A method as claimed in any of claims 1-10, wherein said plasma treatment uses a mixture of at least two gases selected from the group comprising: Nitrogen, Argon, and Oxygen.
12. A method as claimed in claim any of claims 1-10, wherein said plasma treatment uses a mixture of Nitrogen and Argon.
13. A method as claimed in claim any of claims 1-10, wherein said plasma treatment uses a mixture of 80% Nitrogen and 20% Argon.
14. A method as claimed in any of claims 1-10, wherein said plasma treatment uses a mixture of Oxygen and Argon.
15. A method as claimed in any of claims 1-10, wherein said plasma treatment uses a mixture of 30% Oxygen and 70% Argon.
16. A method as claimed in any of claims 1-10, wherein said plasma treatment uses a mixture of 50% Oxygen and 50 % Argon.
17. A method as claimed in any of claims 1-16, wherein said oxygen transmission rate is between 0.01 and 0.03 cc/100in²/day.
18. A method as claimed in in any of claims 1-16, wherein said oxygen transmission rate is no greater than 0.010 cc/100in²/day.
19. A method as claimed in in any of claims 1-16, wherein said oxygen transmission rate is no greater than 0.0035 cc/100in²/day.
20. A method as claimed in in any of claims 1-16, wherein said oxygen transmission rate is no greater than 0.0025 cc/100in²/day.
21. A method as claimed in in any of claims 1-16, wherein said water vapor transmission rate is between 0.02 - 0.035 gr/100in²/day at 100°F and 100% RH.
22. A method as claimed in in any of claims 1-16, wherein said water vapor transmission rate is no greater than 0.02 gr/100in²/day at 100°F and 100% RH.

23. A method as claimed in in any of claims 1-16, wherein said water vapor transmission rate is no greater than 0.015 gr/100in²/day at 100°F and 100% RH.
24. A method as claimed in in any of claims 1-23, wherein said plastic film has been metallized on one side of said plastic film.
25. A method as claimed in in any of claims 1-23, wherein said plastic film has been metallized on both sides of said plastic film.
26. A method as claimed in any of claims 1-23, wherein said plastic film has been plasma treated on one side of said plastic film.
27. A method as claimed in any of claims 1-23, wherein said plastic film has been plasma treated on both sides of said plastic film.
28. A method as claimed in any of claims 1-23, wherein said plastic film has been metallized at least twice on at least one side of the film.
29. A method as claimed in any of claims 1-23, wherein said plastic film has been plasma treated at least twice on at least one side of the film.
30. A method as claimed in any of claims 1-23, wherein said plastic film has been metallized at least twice and plasma treated at least twice.
31. A method as claimed in any of claims 1-23, wherein said plastic film has been plasma treated on a first side of the film and has been metallized on said first side.
32. A method as claimed in any of claims 1-23, wherein said plastic film has been plasma treated on a first side of said plastic film, followed by metallization on said first side, followed by metallization again on said first side.
33. A method as claimed in any of claims 1-23, wherein said plastic film has been metallized on a first side of said plastic film, followed by plasma treatment on said first side, followed by metallization again on said first side.

34. A method as claimed in any of claims 1-23, wherein said plastic film has been plasma treated on a first side of said plastic film, then metallized on said first side, then plasma treated again on said first side, then metallized again on said first side.
35. A method as claimed in any of claims 1-23, wherein said plastic film has been plasma treated on both sides of said plastic film and metallized on both sides of said plastic film.
36. A method as claimed in any of claims 1-23, wherein said plastic film has been plasma treated on a first side of said plastic film, and has been metallized on both sides of said plastic film.
37. A method as claimed in any of claims 1-23, wherein said plastic film has been plasma treated and metallized on a first side and a second side of said plastic film such plasma treatment and metallization being conducted once in any order, followed by plasma treatment again on said first side, followed by metallization again on said first side.
38. A method as claimed in any of claims 1-23, wherein said plastic film has been metallized on both a first side and a second side of said plastic film, followed by plasma treatment on said first side, followed by metallization again on said first side.
39. A method as claimed in any of claims 1-23, wherein said plastic film has been metallized on a first side of said plastic film and both metallized and plasma treated on a second side of said plastic film, followed by a second plasma treatment and second metallization on said second side, said second plasma treatment and second metallization being conducted in either order.
40. A method as claimed in any of claims 1-23, wherein said plastic film has been both plasma treated and metallized on a first side of said plastic film, and metallized on a

second side of said plastic film, followed by plasma treatment on said second side, and metallization again on said second side.

41. A method comprising the steps of:

providing a material for use to make a decorative balloon, said material comprising a plastic film, said plastic film having been subjected to plasma treatment inside the vacuum chamber of a metallization apparatus, said plastic film having been coated on at least one side with a desired metal to form a metallized plastic film, said metallized plastic film comprising an oxygen transmission rate (OTR) of no greater than 0.03 cc/100in²/day, and a water vapor transmission rate of no greater than 0.035 gr/100in²/day at 100°F and 100% RH.

42. A method as claimed in claim 41, wherein said metal is aluminum.

43. A method as claimed in claim 41, wherein said metal is silver.

44. A method as claimed in claim 41, wherein said metal is gold.

45. A method as claimed in claim 41, wherein said metal is tin.

46. A method as claimed in any of claims 41-45, wherein said plastic film comprises polyester.

47. A method as claimed in any of claims 41-45, wherein said plastic film comprises polypropylene.

48. A method as claimed in any of claims 41-45, wherein said plastic film comprises polyethylene.

49. A method as claimed in any of claims 41-45, wherein said plastic film comprises polyvinyl chloride.

50. A method as claimed in any of claims 41-45, wherein said plastic film comprises nylon.
51. A method as claimed in any of claims 41-50, wherein said plasma treatment uses a mixture of at least two gases selected from the group comprising: Nitrogen, Argon, and Oxygen.
52. A method as claimed in claim any of claims 41-50, wherein said plasma treatment uses a mixture of Nitrogen and Argon.
53. A method as claimed in claim any of claims 41-50, wherein said plasma treatment uses a mixture of 80% Nitrogen and 20% Argon.
54. A method as claimed in any of claims 41-50, wherein said plasma treatment uses a mixture of Oxygen and Argon.
55. A method as claimed in any of claims 41-50, wherein said plasma treatment uses a mixture of 30% Oxygen and 70% Argon.
56. A method as claimed in any of claims 41-50, wherein said plasma treatment uses a mixture of 50% Oxygen and 50 % Argon.
57. A method as claimed in any of claims 41-56, wherein said oxygen transmission rate is between 0.01 and 0.03 cc/100in²/day.
58. A method as claimed in in any of claims 41-56, wherein said oxygen transmission rate is no greater than 0.010 cc/100in²/day.
59. A method as claimed in in any of claims 41-56, wherein said oxygen transmission rate is no greater than 0.0035 cc/100in²/day.
60. A method as claimed in in any of claims 41-56, wherein said oxygen transmission rate is no greater than 0.0025 cc/100in²/day.
61. A method as claimed in in any of claims 41-56, wherein said water vapor transmission rate is between 0.02 - 0.035 gr/100in²/day at 100°F and 100% RH.

62. A method as claimed in in any of claims 41-56, wherein said water vapor transmission rate is no greater than 0.02 gr/100in²/day at 100°F and 100% RH.
63. A method as claimed in in any of claims 41-56, wherein said water vapor transmission rate is no greater than 0.015 gr/100in²/day at 100°F and 100% RH.
64. A method as claimed in in any of claims 41-63, wherein said plastic film has been metallized on one side of said plastic film.
65. A method as claimed in in any of claims 41-63, wherein said plastic film has been metallized on both sides of said plastic film.
66. A method as claimed in any of claims 41-63, wherein said plastic film has been plasma treated on one side of said plastic film.
67. A method as claimed in any of claims 41-63, wherein said plastic film has been plasma treated on both sides of said plastic film.
68. A method as claimed in any of claims 41-63, wherein said plastic film has been metallized at least twice on at least one side of the film.
69. A method as claimed in any of claims 41-63, wherein said plastic film has been plasma treated at least twice on at least one side of the film.
70. A method as claimed in any of claims 41-63, wherein said plastic film has been metallized at least twice and plasma treated at least twice.
71. A method as claimed in any of claims 41-63, wherein said plastic film has been plasma treated on a first side of the film and has been metallized on said first side.
72. A method as claimed in any of claims 41-63, wherein said plastic film has been plasma treated on a first side of said plastic film, followed by metallization on said first side, followed by metallization again on said first side.

73. A method as claimed in any of claims 41-63, wherein said plastic film has been metallized on a first side of said plastic film, followed by plasma treatment on said first side, followed by metallization again on said first side.
74. A method as claimed in any of claims 41-63, wherein said plastic film has been plasma treated on a first side of said plastic film, then metallized on said first side, then plasma treated again on said first side, then metallized again on said first side.
75. A method as claimed in any of claims 41-63, wherein said plastic film has been plasma treated on both sides of said plastic film and metallized on both sides of said plastic film.
76. A method as claimed in any of claims 41-63, wherein said plastic film has been plasma treated on a first side of said plastic film, and has been metallized on both sides of said plastic film.
77. A method as claimed in any of claims 41-63, wherein said plastic film has been plasma treated and metallized on a first side and a second side of said plastic film such plasma treatment and metallization being conducted once in any order, followed by plasma treatment again on said first side, followed by metallization again on said first side.
78. A method as claimed in any of claims 41-63, wherein said plastic film has been metallized on both a first side and a second side of said plastic film, followed by plasma treatment on said first side, followed by metallization again on said first side.
79. A method as claimed in any of claims 41-63, wherein said plastic film has been metallized on a first side of said plastic film and both metallized and plasma treated on a second side of said plastic film, followed by a second plasma treatment and second metallization on said second side, said second plasma treatment and second metallization being conducted in either order.

80. A method as claimed in any of claims 41-63, wherein said plastic film has been both plasma treated and metallized on a first side of said plastic film, and metallized on a second side of said plastic film, followed by plasma treatment on said second side, and metallization again on said second side.